
STEM EDUCATION AND SOCIAL JUSTICE

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The Science, Technology, Engineering, and Mathematics (STEM) field is greatly promoted as a career path for students in recent years, and the demand for individuals specializing in STEM disciplines is expected to rise. Often, when considering STEM, one thinks of careers related to medicine, laboratory settings, or the pure sciences. However, in examining only these aspects of STEM, we may errantly overlook the impacts that P-20 education may have in using STEM as a means for improving student lives. One unique aspect of STEM is its role in helping to improve our well being as individuals and society as a whole, not only through improvements in fields such as technology and medicine, but also as a stimulus for promoting improvements in the community and beyond. There are opportunities for STEM education to aid in social justice through examining local community issues, including environmental quality and access to health and nutritional services, among other topics. As noted by Webb and Barrera in this edition of *Catalyst* (2017), “The primary focus of education is to improve students’ lives by providing means to overcome the inequities of school and society, and it is the responsibility of teachers to see that this happens for every learner.” This issue of *Catalyst* aims to present a collection of works that examines the role of STEM education in aiding in these opportunities not only for the PK-12 classroom, but also in the college classroom and through pre-service educator training.

In recent months, Parker, Pillai, and Roschelle (2016) released a report entitled *Next Generation STEM Learning for All: Envisioning Advances Based on NSF Supported Research*. The report not only highlights the need to encourage STEM engagement and participation for traditionally marginalized students, but it also notes that *access* to STEM itself is an issue of social justice. By enabling opportunities for all learners to engage in STEM with a social justice lens, Parker et al. (2016) noted that “assuring access to STEM learning for learners traditionally underrepresented in STEM fields can provide opportunities for individual success as well as broader changes that contribute to social justice. Additionally, using a social justice lens to actively engage learners in STEM content provides motivation and engagement not found in decontextualized academic knowledge” (p. 5).

However, the opportunities to engage students in STEM and social justice can be fraught with challenges. The STEM fields, including those focused on STEM education, are in uncharted territory in the era of a new administration. In 2011, former President Barack Obama called for recruiting, training, and retaining 100,000 more STEM teachers within the decade (Obama, 2011). Now, at the time of publication, proposed budget cuts to organizations including the National Institutes of Health, the Environmental Protection Agency, the National Science Foundation, and other federal agencies, along with proposed decreases in funding to educational programs including block grants and 21st Century Community Learning Centers, threaten both scientists’ and educators’ opportunities to further their research in STEM and social justice (Fountain & Schwartz, 2017; Kamenetz, 2017).

Despite the challenges, there is still hope. Teachers and university programs alike are considering the manner in which STEM can be used to prepare future teachers and empower students within the community. Rather than view STEM as an “ivory tower” career, many individuals are instead embracing it as a tool to instill change and to serve those in the public sector. This issue of *Catalyst* examines how the respective contributors understand “social justice” in STEM Education and how it relates to their work with pre-service teachers, in-service teachers, and students. In this collection of works, we begin with Pitts Bannister, Davis, Mutegi, and Thompson’s examinations of how mathematics curriculum could focus on improving the social conditions of African American and Africans worldwide, through changes in curriculum and pedagogy. This is followed by Webb and Barrera’s study of simulated language learner experiences in teacher education, emphasizing the need for preservice educators to

consider the ways in which STEM is made accessible to all students in the classroom. Finally, we examine two different perspectives on how to address social justice and STEM education at the high school and college levels. This is done first with Madden, Wong, Vera Cruz, Olle, and Barnett's curricular framework for using social justice-driven STEM in a college-access program for high school students, and followed by Sondel, Koch, Carrier, and Walkowiak's examination of using STEM in teacher education programs to develop future teachers enact opportunities for social justice with their students and community. Together, this edition sends a message of hope for STEM as a driving force for modeling innovative approaches to social justice in a growing field.

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TABLE OF CONTENTS

1. “Returning to the Root” of the Problem: Improving the Social Condition.....4
of African Americans Through Mathematics Education
Vanessa R. Pitts Bannister, Julius Davis, Jomo Mutegi, LaTasha Thompson, Debra D. Lewis
2. Providing Equal Opportunity to Learn Science for English Language Learners:16
The Role of Simulated Experiences in Teacher Preparation
Angela W. Webb, Estanislado S. Barrera, IV
3. Social Justice Driven STEM Learning (S_{TEM}J): A Curricular Framework for Teaching24
STEM in a Social Justice Driven, Urban College Access Program
Paul E. Madden, Catherine Wong, Anne C. Vera Cruz, Chad D. Olle, Mike Barnett
4. Toward a Theory of Teacher Education for Justice-Oriented STEM.....38
Beth Sondel, Joanna Greer Koch, Sarah Carrier, Temple A. Walkowiak